

Progress Report

ECE-403

Group Number: SD0809

Direction Coupler(s)

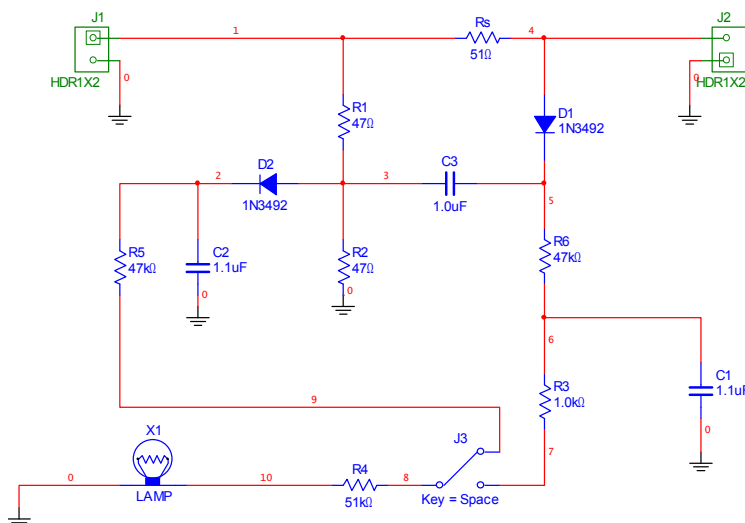
Group Member(s): Aakash Malik

Sandeep Pal Singh

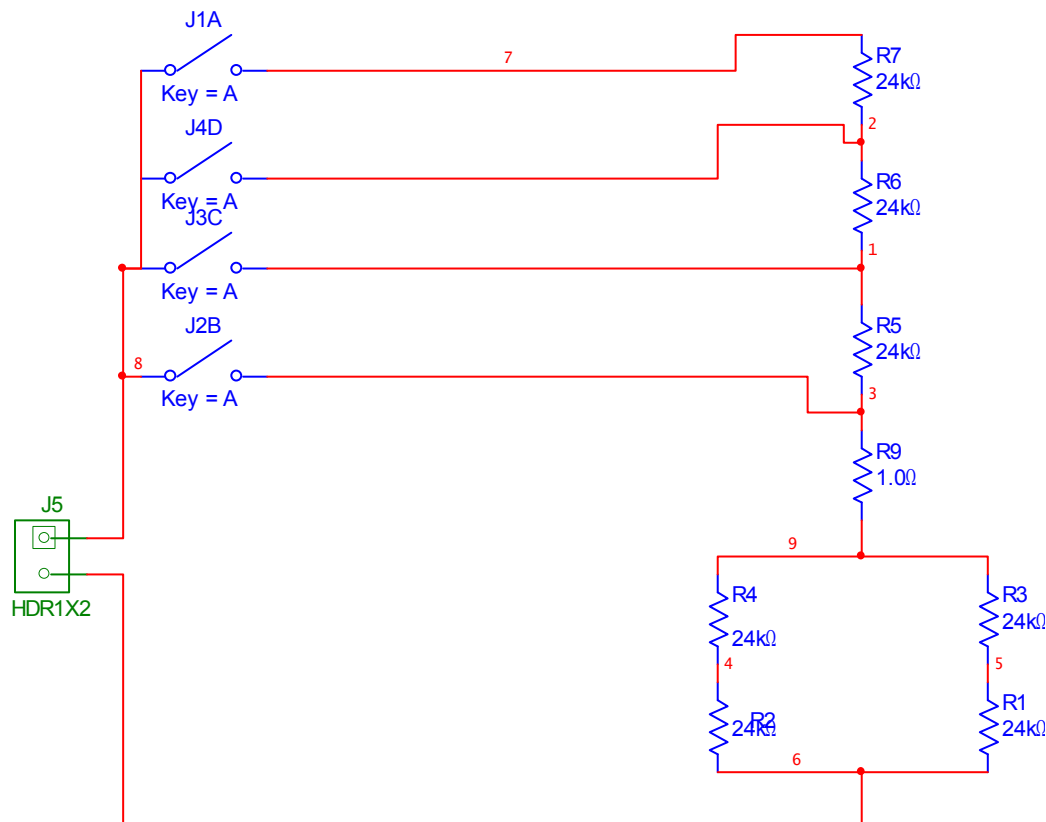
Advisor: Dr. David Rogers

The primary goal of this project is to design and construct three or four devices that measure the VSWR in the frequency range 1.8 to 144 MHz and compete with the directional couplers those used in ECE labs clearly demonstrating the basic science and engineering of the device. Basically each of these devices will be appropriate for the class room demonstration of the concepts of VSWR, forward power, reverse power and/or related concepts. Common properties desired for all directional couplers are wide operational bandwidth, high directivity, and a good impedance match at all ports when the other ports are terminated in matched loads. These performance characteristics play vital role for the accuracy of the directional couplers and our main focus will be to achieve accuracy that can compete with those available in the market. Out of these four directional couplers the first device will be based on simple principles, that is, it might just provide a good estimate of VSWR, and then we will move on to a more sophisticated and accurate one.

First day of the project started with discussions about the project requirements, Sandeep, Sanjay and I (Aakash) started working on the project requirement and finally along with the recommendation of our advisor we finally came to the conclusion that the project will cover three models or may be four (if time permits), this semester we are working on the first two models and the dummy load which will be used with the two devices. First two weeks passed in the study and research work about the project, in which we decided our basic approach and the technique that we will be using in making the models and this covered the part included in the option consideration paper. Then we started working on our very first model which is based on the resistance bridge technique, the design schematic we made is,



Sandeep and I (Aakash) started searching the catalogs and various sites for the components, and by the end of that week we ordered few parts of the resistance bridge, we Sandeep, Sanjay and I (Aakash) started assembling parts on the bread board, as it was taking time in getting few components due to shortage and other problems, we started working on the dummy load. All three of us decided to do some search for the dummy load on the net and to meet with the results in the next meeting, Sandeep, Sanjay and I (Aakash) came up with 3, 1 and 3 designs each for the dummy load, out of which we selected three designs which we showed to our advisor in the very next meeting, in that meeting Dr. Rogers suggested us to build a dummy load which has a variable resistance that can be altered at our convenience so that we can see the results of our models at different loads, so Sandeep and I (Aakash) started working on that and came up with a solution to make a dummy load which will have resistance values of 25,50,75 and 100 ohm and the resistance of that dummy load can be changed using a switch,



Although the figure shows four separate switches we will be using a single 4 point selector switch in our dummy load design.

After this one of our team member, Sanjay, decided to drop the course as he was feeling as he is not contributing much in the project work. In the mean while we started planning for our second device in which we will be using the tandem match technique, after Dr. Rogers approved both our designs for both, dummy load and tandem match, Sandeep and I (Aakash) started searching the components both these devices and placed an order, although we still have to order a couple of components but we don't want to rush on that as we have some financial issues about them, so Sandeep and I (Aakash) are searching for cheaper alternatives. Currently Sandeep and I (Aakash) were working on designing the PCB's for both the dummy load and the resistance bridge, the work that we have to do on the mili-machine is left the software part of it is already done, we will be working on the mili-machine on our next meeting this Monday.

Sincerely

Aakash Malik

Sandeep Pal Singh

Advisor's Signature